PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re National Stage of International Application No. PCT/EP2003/051102 under 35 U.S.C. § 371 of:	)	
Antonio ADIGRAT et al.	)	Group Art Unit: 1791
Application No.: 10/584,092	)	Examiner: Erin Lynn Snelting
§ 371 Date: March 30, 2007	)	Confirmation No.: 8919
PCT Filing Date: December 24, 2003	)	
For: PROCESS FOR PRODUCING A LOW-ATTENUATION OPTICAL FIBER	)	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION UNDER 37 C.F.R. § 1.132

I, Franco Cocchini, declare and state that:

1. I am an Italian citizen, residing at Salerno, via Mercanti 150, 84121 (Italy).

2. I have been awarded a Ph.D. in Physics from Scuola Normale Superiore of Pisa (Italy).

3. I have been employed by F.O.S. Fibre Ottiche Sud S.r.l. since December 1990, and I am presently a Product Development Leader at F.O.S.. During my employment at F.O.S., I have been engaged in research and development regarding production of optical fibers. F.O.S. was part of the Pirelli Group when U.S. Patent Application No.: 10/584,092 was filed, but is now part of the Prysmian Group.

4. I am one of the inventors of U.S. Patent Application No.: 10/584,092.

5. Given my education and experience, particularly in the area of optical fiber production, I consider myself able to provide the following testimony based on the following experiments previously conducted by former Pirelli employees.

EXPERIMENTS

6. Testing was performed to compare the optical loss of optical fibers produced from preforms with varying central hole diameters after the end of the drying and consolidating step.

I. Preparation of the Optical Preforms and Fibers

7. A series of 27 optical fiber preforms were prepared with a central substrate. After the substrates were removed from the preforms to form a central hole, the preforms underwent a drying step to eliminate hydroxide ions and water molecules from the preform, including the central hole, and then a consolidating step. As part of the drying and consolidating step, without extracting the preform from the furnace where the drying and consolidating steps were carried out, the preforms were subjected to a further thermal treatment in the same furnace for reducing the diameter of their central holes. During this further thermal treatment, vacuum was created inside the central hole so as to reduce the pressure in the hole down to a value lower than 100 mBar. The temperature was of about 1520°C. After this further thermal treatment, the preforms were extracted from the furnace and an average diameter for the central hole of the glass core preform was determined and recorded. The glass core preforms were

identical to each other with the exception of having different central hole diameters after extraction from the furnace where the drying and consolidating step (including the further thermal treatment for reducing the diameter of the central hole) was carried out.

8. The fabricated preforms were stored at room temperature in non-controlled atmosphere (air) for a storage period ranging from few hours to few days. The period of time being random among the fabricated performs. Each fabricated preform was then stretched for closing the central hole and forming several canes (typically 6 canes were obtained for each preform). The conditions of the stretching step were as follows: pressure inside the reduced-diameter central hole of the preforms = 1 mBar; stretching temperature = 1920-1980°C; tractor speed= 25 cm/min. Then, each cane was overcladded, dehydrated and consolidated to obtain an overclad preform, which was then drawn to form an optical fiber of a length ranging from 200 km to 300 km in multiple bobbins. Then, the attenuation loss was measured for each bobbin of optical fiber.

II. Testing Procedure

9. The average diameter for the central hole after the further thermal treatment performed at the end of the drying and consolidating steps was determined by the method described in the International patent application WO 2008/046447. In particular, for each preform, three different images at three different angles were acquired and averaged to obtain the diameter of the central hole at positions spaced by 25 mm along the longitudinal direction of the preform.

10. The attenuation loss of the obtained optical fibers was measured at a wavelength of 1380 nm using an Optical Fiber Analysis System, model 2200 commercialized by Photon Kinetics, Inc.

11. The.results are shown in attached Figure 1, which shows the attenuation loss measured for each optical fiber plotted against the central hole diameter after the further thermal treatment carried out in the drying and consolidating furnace of the preform from which the fiber was drawn. In particular, each point of the graph indicates the minimum attenuation loss measured on the optical fibers obtained from a same overclad preform. The trend line was determined as a polynomial fitting line with degree equal to 3, obtained by applying the known least square method.

III. Conclusion

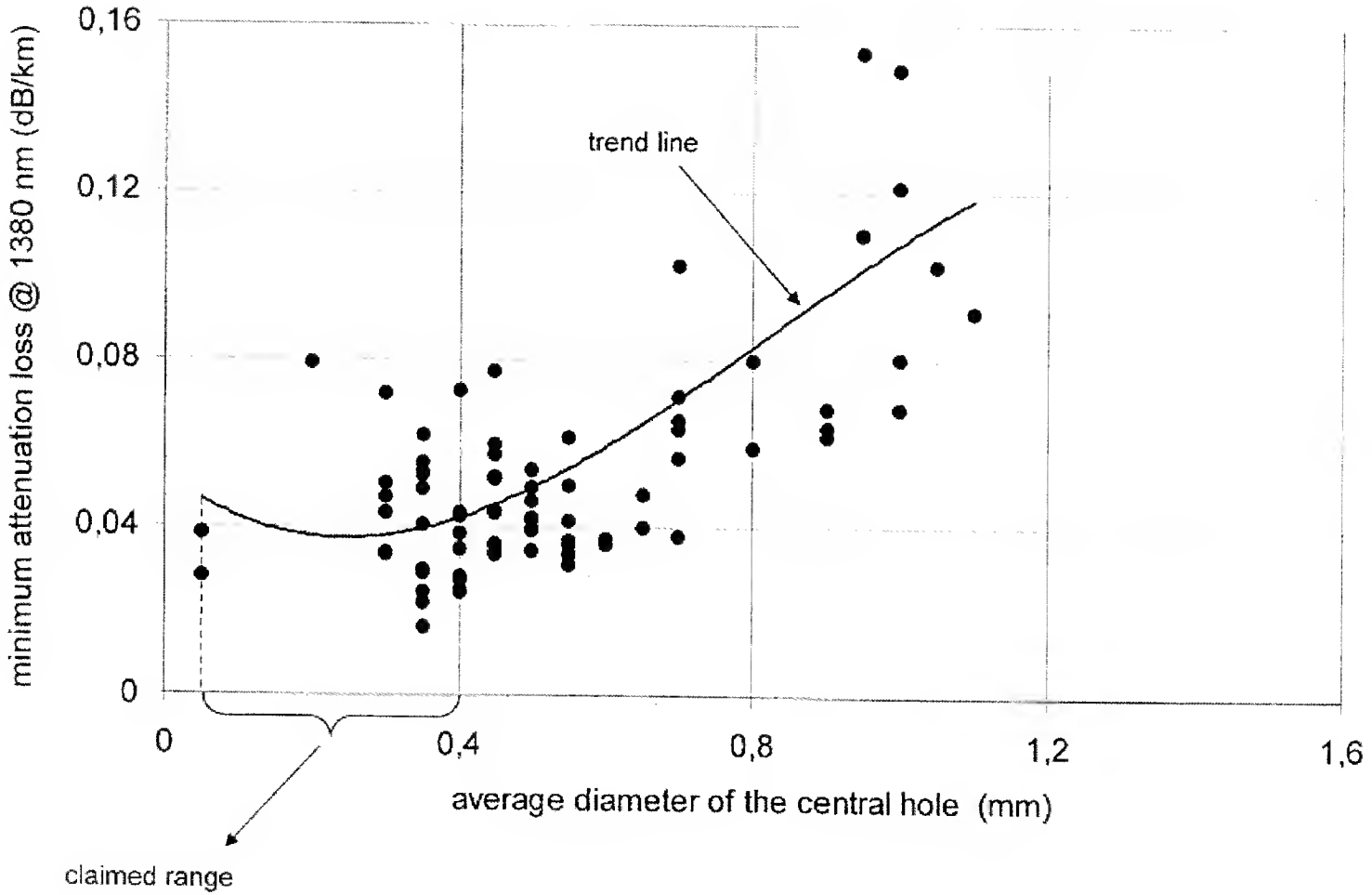
12. One can reasonably conclude from the results reported in Figure 1 that optical fibers produced from preforms with central hole diameters after the end of the drying and consolidating step in the range of about 0.05mm to about 0.40mm result in significantly lower attenuation loss as compared with optical fibers produced from preforms with central hole diameters after the end of the drying and consolidating step falling outside the range of about 0.05mm to about 0.40mm. In particular, it was discovered that a diameter of greater than 0.4mm should be avoided because of a non-negligible OH ion/water molecule rewetting of the central hole and the resultant attenuation losses. It was also discovered that a diameter less than 0.05mm should be avoided because of internal defects formed and the resultant attenuation losses.

13. Based on my education and experience, it is my opinion that one of ordinary skill in the art would not have expected that an optical fiber, produced from a preform with a central hole diameter after the end of the drying and consolidating step in the range of about 0.05mm to about 0.40mm, would exhibit significantly lower optical loss than an optical fiber produced from a preform with a central hole diameter after the end of the drying and consolidating step falling outside the claimed range.

14. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and believe are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: Aug 1st 2010

By: _____
Franco Cocchini


0,16
0,12
0,08
0,04
0
minimum attenuation loss @ 1380 nm (dB/km)
trend line
0
0,4
0,8
1,2
1,6
average diameter of the central hole (mm)
claimed range

Aug. 2nd, 2010